

economic influence over the region, caused by Baltimore's rise, the competition for markets between the two cities, and a drop in the consumption by foreign markets of Philadelphia's agricultural produce. The region responded by diversifying its agricultural production and devoting more resources to manufacturing.

Much of the reemergence and success of both industry and agriculture in Delaware can be attributed to improved transportation facilities beginning in the 1830's. The linking of Wilmington by railroad with Baltimore and Philadelphia in 1837 provided Wilmington and its hinterland with markets for raw materials and finished goods. Also contained within this hinterland was a sizeable population of mechanics and machinists able to perform the skilled labor required by new technologies. This combination of enhanced transportation facilities, a large trained labor pool, and a ready supply of raw materials allowed industry in northern New Castle County to grow and diversify rapidly into the twentieth century.

RESEARCH METHODS

Background Research

Phase I background research included consultation with the staff of the Delaware Bureau of Archaeology and Historic Preservation (BAHP), review of all inventories of prehistoric and historic cultural resources maintained by the BAHP, review of historic atlases and maps, interviews with local landowners and experts in local history, examination of archival materials such as deeds, tax assessments, probate records, road books and petitions, and other court records, inspection of aerial

photographs on file at the Soil Conservation Service, Glasgow Office, and review of the prehistoric archaeological literature on applicable predictive models (Custer 1983, 1984).

Field survey methods for Phase I Field Reconnaissance survey included pedestrian survey of all sections of the Project Corridor to reveal cultural resources such as standing structures or structural foundations which might be present, and to determine the general nature of the corridor for subsequent application of surface survey or subsurface testing. Surface survey was conducted on all portions of the Project Area under cultivation at the time of field activities. In areas not cultivated, Phase I subsurface testing was necessitated. Because of its greater cost in time and labor, however, a subsurface testing design was developed for prehistoric resources in the Project Area to guide the location and intensity of effort. This testing design, and the procedures employed for Phase I surface survey and testing are described below.

Phase I Testing Design

Predictive models have been developed elsewhere in the Eastern United States to guide archaeological testing designs, based on hypotheses of prehistoric exploitation of resources by human groups. In central New York State, for example, archaeologists have derived a model predicting that prehistoric groups were attracted to areas of environmental diversity where the concentration of different resources facilitated their joint exploitation (Curtin 1981). Such an approach becomes difficult to apply, however, on survey corridors of moderate size which are restricted in their physiographic variability. Such is

the case for the Route 896 Corridor, whose 6.3 mile length is contained entirely within the Mid-Peninsular Drainage Divide. Its topographic character suggests a low level of environmental diversity in the prehistoric period when compared with other sections of the Coastal Plain to the east or west, or to portions of the Piedmont Uplands to the north.

In discussing prehistoric site location, Vita-Finzi and Higgs observe that "a site...normally represents a situation which is atypical of the area in which it lies, and its abnormalities are as important to an archaeological study as its normalities" (1970:5). In an area of low environmental diversity such as the Route 896 Project Corridor, this perspective is useful in developing a testing strategy weighted by expectations of site location. The variables of slope, elevation, and drainage, which affect environmental variability through their influence on edaphic resources, are muted over most of the Project Corridor. Upper and lower ranges of slope and elevation are restricted to the flanks of Iron Hill and the weakly incised stream heads intersecting the Corridor. It is at these locations that one would expect fluctuations in biotic resource composition, constituting more attractive locations for prehistoric groups than intervening stretches of the Project Corridor. For the Route 896 Project, these locations were assumed to be zones with a high probability for prehistoric site location.

To determine for survey purposes how large such high probability zones should be, the Delaware prehistoric site files

at the Bureau of Archaeology and Historic Preservation were consulted for data on distance of known prehistoric sites from such features. For sites in the project area vicinity within and adjacent to the Mid-Peninsular Drainage Divide, 31 of 34 were located within 200 meters of an existing or previously existing watercourse (Figure 3 and Table 2). Thirteen of these were situated within 100 meters of such features. Based on this review, the right-of-way was divided into probability zones for the occurrence of prehistoric sites. Sections of the right-of-way within 200 meters of water courses were designated as high probability zones, while intervening corridor segments received low probability assessments (Figure 4). That portion of the Project Corridor adjoining the east flank of Iron Hill was designated a high probability zone both because of its aspects of elevation and drainage, and also because of the presence of lithic resources there.

Management plans for prehistoric cultural resources in Delaware (Custer 1986; Custer and DeSantis 1986) also indicate the potential for archaeological resources by each prehistoric time period within the Project Area. It should be noted that the Management Plan for northern Delaware (Custer and DeSantis 1986), is only partially applicable to the discussion here as it does not include the southern half of the Project Area.

For the Paleo-Indian Period, an important factor is the location of the Delaware Chalcedony Complex, including Iron and Chestnut Hills, in the northern portion of the Project Area. The focus on localized, high-quality siliceous raw materials for stone tools by Paleo-Indian groups is well documented through

FIGURE 3

**Bar Chart of Distances to Surface Water for Select
Prehistoric Sites in the Route 896 Project Vicinity**

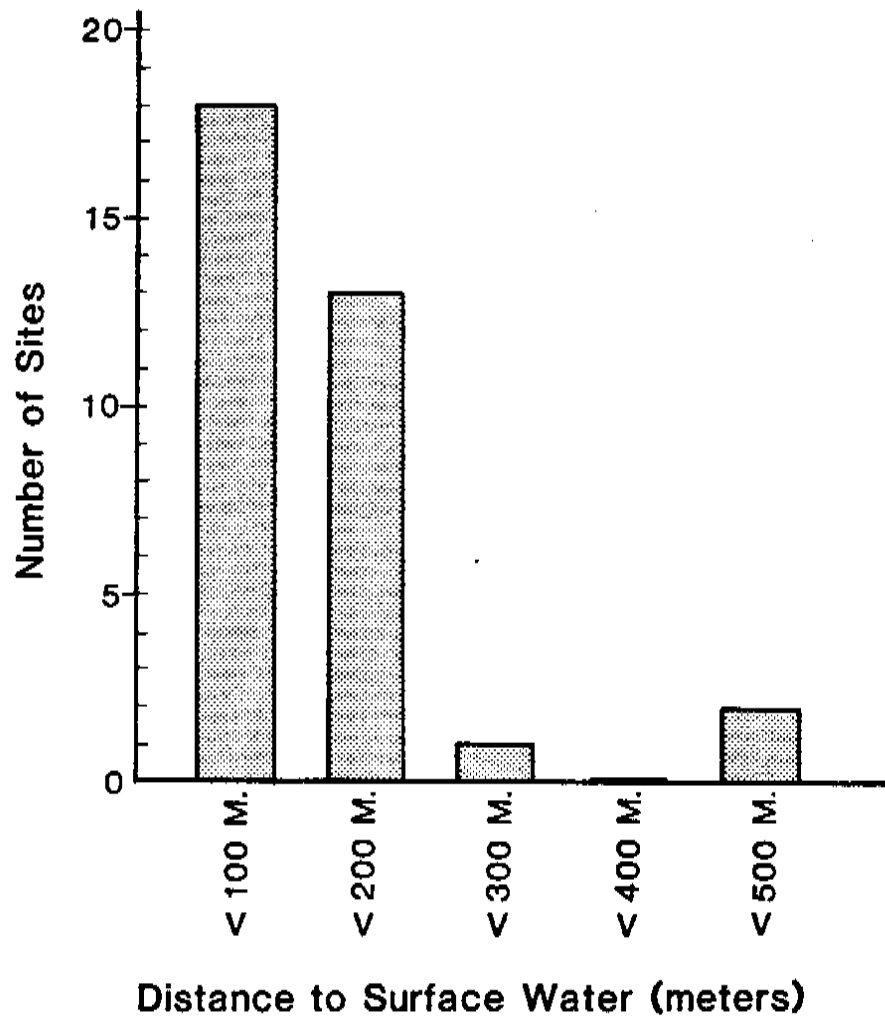


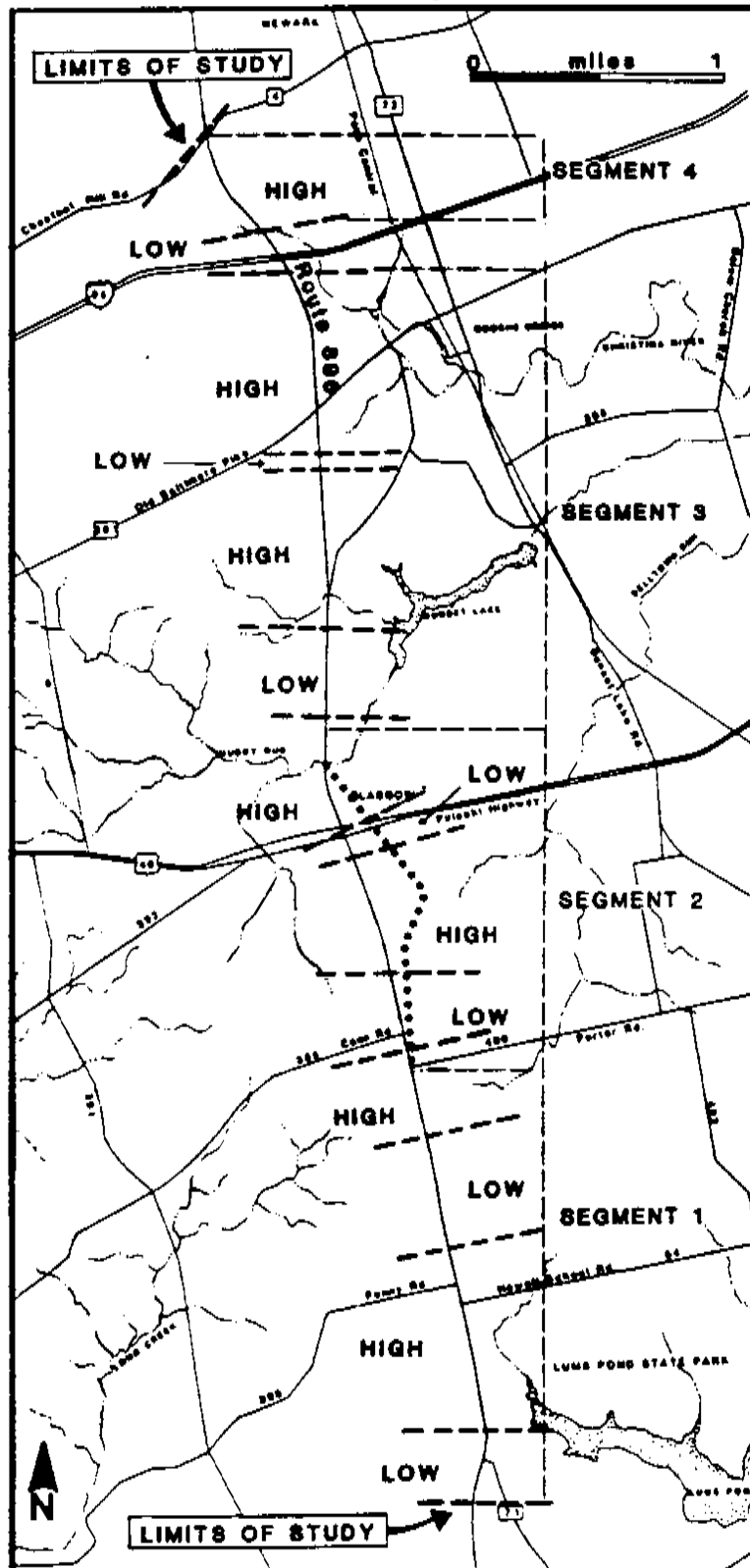
TABLE 2

DISTANCE TO SURFACE WATER FOR SELECT
PREHISTORIC SITES IN THE ROUTE 896 PROJECT VICINITY

CRS No.	<100 m	<200 m	<300 m	<400 m	<500 m
3741	X				
3742	X				
3743	X				
3744	X				
3745	X				
3758	X				
3759		X			
3760					X
3761					X
3762		X			
3777		X			
3778	X				
3779	X				
3781	X				
3782		X			
3783		X			
3784		X			
3785		X			
3954	X				
3966a	X				
3966b			X		
5013		X			
6319	X				
6321a	X				
6321b		X			
6761		X			
7648	X				
7649a	X				
7649b		X			
7649c	X				
7649d	X				
7846		X			
7847		X			
9572	X				
	18	13	1	0	2

much of eastern North America (Goodyear 1979). The Delaware Chalcedony Complex in northern Delaware and adjoining Maryland was an important lithic source for prehistoric groups from all time periods (Custer and Galasso 1980; Custer, Ward and Watson n.d.), but should have been particularly important to Paleo-

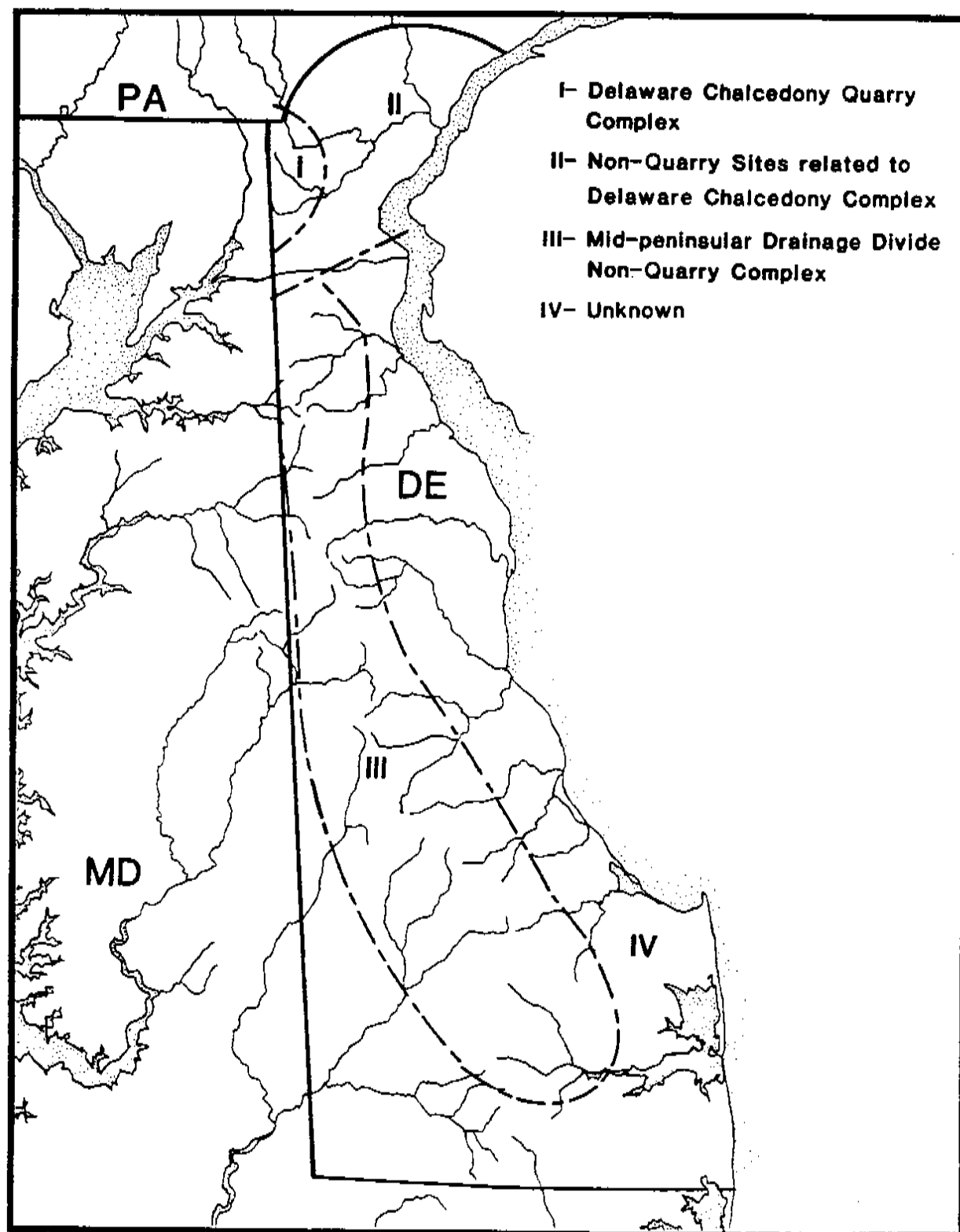
FIGURE 4
Probability Zones for Prehistoric Site Locations,
Route 896 Project Area



Indians. Roughly the northern half of the Project Area is included in a major study unit for the Paleo-Indian Period, centered around the Delaware Chalcedony Complex (Custer 1986:45-47) (Figure 5). Expected site types include a range of Paleo-Indian occupations related to the initial procurement and processing of jasper for stone tool kits. Possible examples of such sites include 7NC-D-3 and 7NC-D-15, which have yielded Paleo-Indian as well as later materials in surface collection; both of these lie well to the northwest of the Project Area. Further south, at the southern limit of this Paleo-Indian study unit, is the Butterworth Site (7NC-D-23), located in Glasgow. Situated south of Muddy Run and west of the Project Area, this site has yielded two fluted points.

For the Archaic Period, the Project Area lies within the Drainage Divide study unit (Figure 6). In general, cryptocrystalline lithic sources no longer constitute a major focus because of the less restrictive raw material preferences of Archaic hunter-gatherers. There is instead an expected focus on resource-rich settings such as bay-basin features and poorly-drained swamp settings (Custer 1986:64). Within the settlement pattern hypothesized for the Drainage Divide study unit, a range of procurement, micro-band and macro-band site types are expected. Bay basin features and swampy locales are absent from the Route 896 Project Area. Therefore, micro-band base camps and procurement sites are therefore expected to be the only Archaic manifestations in this vicinity (Custer and DeSantis 1986:42). Presumed examples of such sites have been noted by Wise in Lums

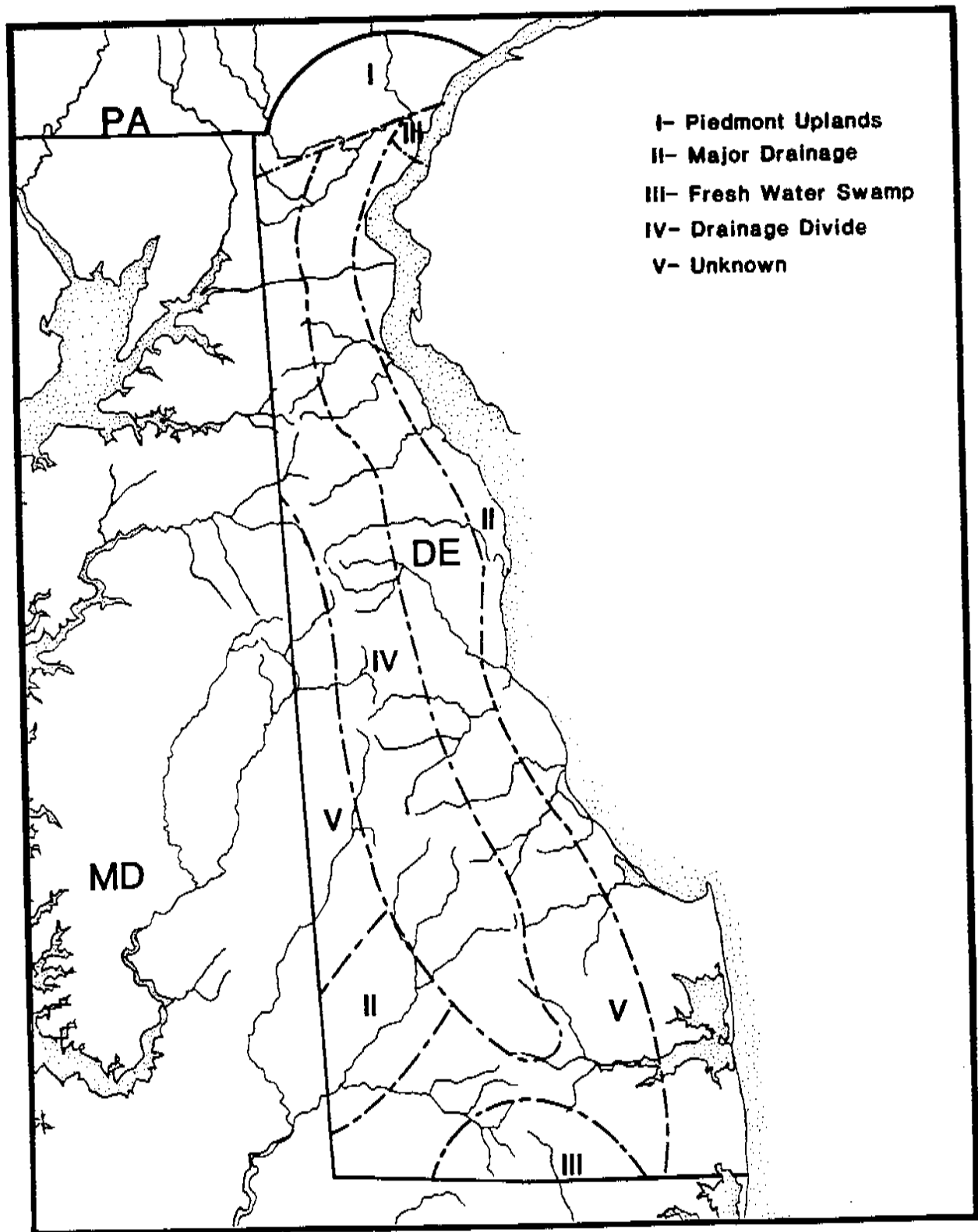
FIGURE 5
Paleo-Indian Study Units Located in Delaware



Source: Custer 1983:45

FIGURE 6

Archaic Study Units Located in Delaware



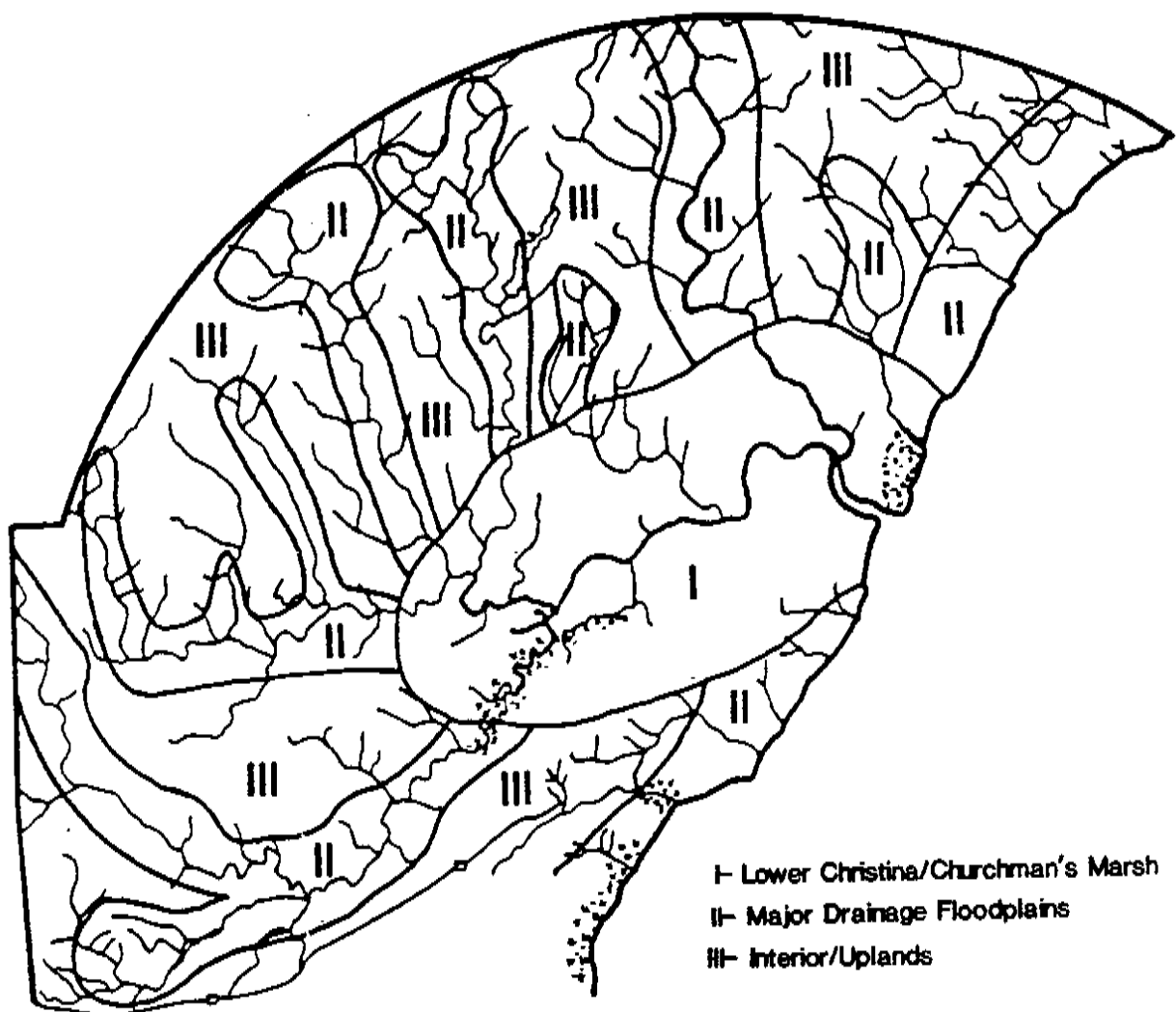
Source: Custer 1983:65

Pond State Park, east of the Project Area, including 7NC-F-34, 7NC-F-18, and 7NC-F-2 (1986). One other Archaic site in close proximity to, but outside, the Project Area is the Barczewski Site (7NC-D-91), located in Glasgow south of Muddy Run.

As noted, the Woodland I Period is reflected in a shift toward site locations along major river floodplains and estuarine swamps in conjunction with warmer, dry environments and continued sea level rise. Sites in these settings appear to represent protracted occupations by large groups. One small portion of the Project Area is included in Northern Delaware study unit no. 2, along the floodplains of major drainages (Custer and DeSantis 1986:51) (Figure 7). In these areas, macro-band base camp sites are expected, and the immediate vicinity of Christiana River in the northern portion of the Project Area would be included here. However, substantial disturbance from I-95 construction and commercial and residential development in this area may well have impacted such potential resources.

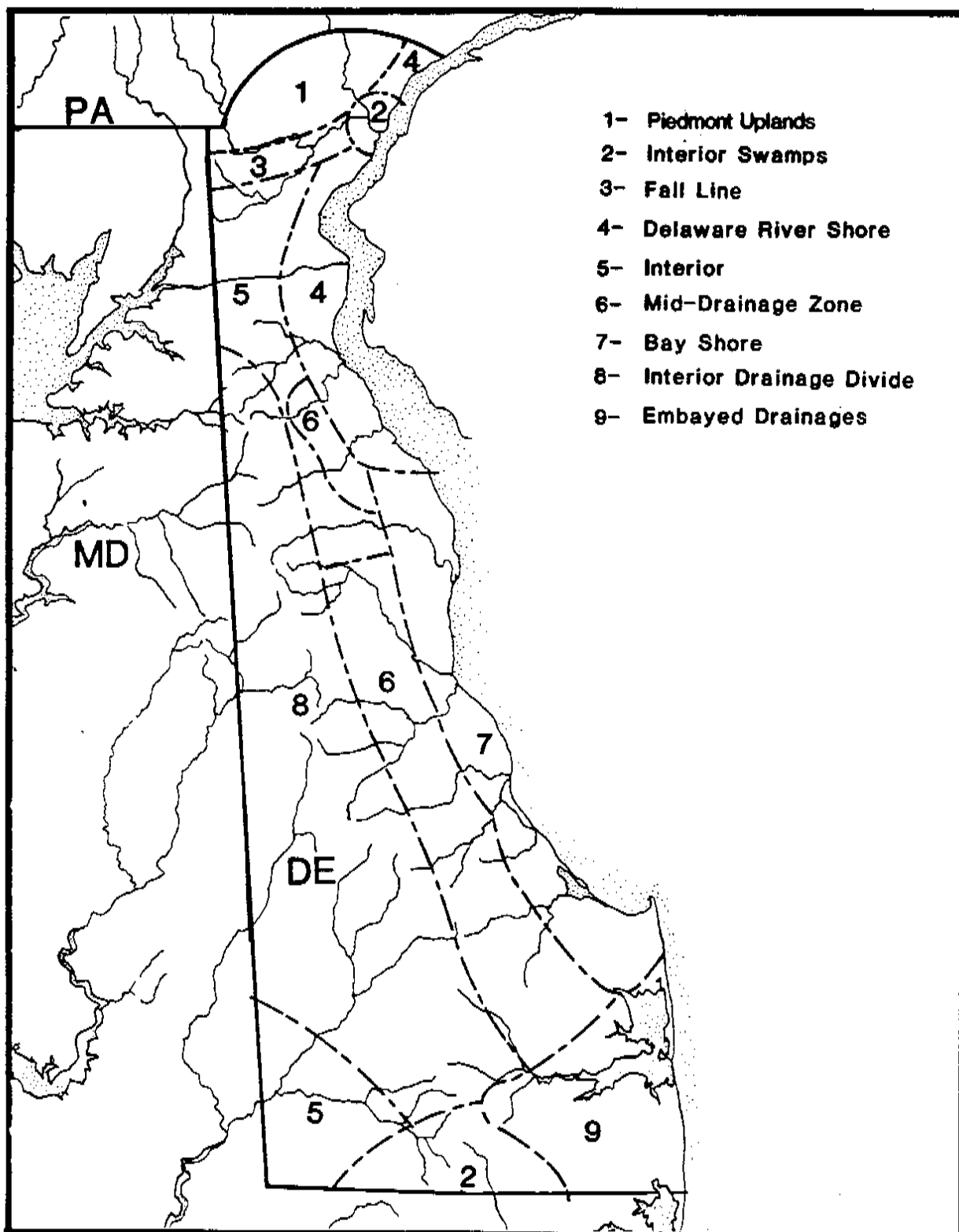
The remainder of the Project Area is contained within the Interior study unit (Custer 1986:97-98, 100) (Figure 8), away from the richest resource settings of the period. In these areas, smaller, more ephemeral sites, such as procurement and micro-band base camp occupations are expected, at well-drained locations adjoining swamps and streams. For the major part of the Project Area which this includes, swamps are absent, but several streams, such as Muddy Run and other unnamed small watercourses cross the proposed right-of-way and could be the setting for these smaller, Woodland I sites. Examples in the Project Area vicinity include

FIGURE 7
Woodland I Study Units in Northern Delaware



Source: Custer & DeSantis 1986:51

FIGURE 8
Woodland I Study Units Located in Delaware



Source: Custer 1983:100

7NC-F-18 and 7NC-F-2 near Lums Pond and 7NC-D-91, the Barczewski Site, in Glasgow south of Muddy Run.

Study units for the Woodland II Period remain the same as those of the Woodland I (Figures 7 and 8), reflecting the observation that many of the Woodland I base camp locations were reoccupied in the subsequent period with little change in artifact assemblages. This is suggested in the Project Area vicinity at sites 7NC-F-2 and 7NC-D-91 mentioned above which have yielded material from both periods.

Background research on historic cultural resources of the Project Area revealed these to be concentrated in the vicinity of Glasgow and to the south. This is primarily a reflection of the development of transportation networks in and around Route 896 over the past three centuries. The eighteenth century precursor of Route 896, Old Glasgow Road, ran from the Summit Bridge vicinity, through Glasgow, and then swung in a wide arc to the east, crossing the Christina at Cooch's Bridge before veering northwesterly back towards Newark. It was not until the construction of existing Route 896 in 1937-38 that any changes occurred in this roadway. South of Glasgow, Route 896 was built on its existing path. North of this village, however, it diverged from the old route to take a more direct, northerly path to Newark by skirting the east flank of Iron Hill and then crossing the Christina before entering Newark. The remnant of Old Glasgow Road north and south of Cooch's Bridge was maintained as a secondary route and renamed County Road 408.

Thus, where present Route 896 matches the original path of Old Glasgow Road, evidence of nineteenth and early twentieth century occupation is present. North of its junction with County Road 408, however, virtually all structures adjacent to Route 896 postdate its 1938 completion date.

Although New Castle County historically has had a more diverse economic base than its Kent or Sussex counterparts, this is generally not reflected in the historic development of the Project Area. As noted previously, agricultural concerns dominated past economies and remain important today over much of the Project Area. Potential historic cultural resources revealed by background research generally reflect this pattern, consisting primarily of agricultural or related concerns.

Phase I Surface Reconnaissance Procedures

Phase I surface reconnaissance of plowed fields was conducted primarily in southern portions of the Project Area where agriculture continues to dominate land use patterns. All fields bordering the right-of-way with surfaces exposed by cultivation were systematically surveyed for cultural remains. The location of cultural material encountered during reconnaissance was flagged. All prehistoric materials observed were recorded as to location; once the limits of cultural material were ascertained, items were then collected. Appendix I contains the total artifact counts.

Treatment of historic materials was somewhat different. Isolated occurrences of historic artifacts, particularly whiteware, redware, and brick fragments, are ubiquitous to the fields in the Project Area, and represent isolated instances of

discard that have occurred throughout the historic period. Such finds do not constitute significant cultural resources and were therefore not collected or recorded. Documentation and sampling of historic materials in cultivated fields was only carried out when concentrations of material, indicating potential historic occupation, were observed. In such instances, limits of the surface material were noted, and a partial or complete collection of select artifact classes was made (Appendix I).

Phase I and II Testing Procedures

Shovel test pits were employed as the standard Phase I test unit because of their effectiveness in detecting buried cultural materials (McManamon 1981) combined with the low intensity of effort required for their excavation compared with larger, measured test units. All undisturbed portions of the right-of-way proposed for dualization with ground cover were tested. High probability zones were subject to systematic shovel testing at 20 meter intervals, while a 30 meter interval was used in low probability zones. In high probability areas, testing was also conducted at a twenty meter interval on right-of-way margins across from dualized sections due to potential secondary impacts to cultural resources from proposed construction.

Shovel test pits were placed at or near proposed right-of-way limits: 30 meters (99 feet) from the existing roadbed for dualized margins and 10 meters (33 feet) from the existing roadbed for non-dualized margins of Route 896. Field personnel excavated shovel test pits to a minimal standard depth of 70 centimeters. Soil was passed through 6 millimeter (1/4 inch) hardware mesh, and all cultural materials recovered were bagged

according to individual test units. Field notes for each test pit included thickness, color and textural characteristics of horizons encountered, and cultural materials recovered. If prehistoric cultural material was encountered, four shovel tests bracketing the original unit were excavated at a preferred standard distance of three meters from it. If these tests yielded additional material, a decision was made whether to implement Phase II investigations.

For reference purposes, shovel tests were grouped into transects, each transect receiving a letter designation and including a continuous sequence of shovel tests. Shovel tests were numbered with a sequence for each transect in ascending order from south to north. The locations of these transects are depicted in Figures 14, 41, 69, and 82, and additional details are provided in Table 3.

The aim of Phase II investigations was to define limits, integrity and stratigraphic context of archaeological sites warranting such study so that a determination of National Register Eligibility could be made. Field procedures included controlled surface collection or excavation of systematic shovel test grids to determine material concentrations. High density areas were then tested with measured excavation units to determine stratigraphic context and detect cultural features.

PHASE I AND II INVESTIGATIONS

To facilitate discussion of cultural resources identified by background research or Phase I field reconnaissance survey, the Project Area was divided into four segments: 1) from Summit